CLAIMS

The invention claimed is:

1. A method of forming a particle-containing material over a semiconductor substrate, comprising:

forming first particles across at least a portion of a surface of the semiconductor substrate;

forming a monolayer over the particles;

forming second particles over the monolayer; and

wherein the first particles, second particles and monolayer are comprised by the particle-containing material.

2. The method of claim 1 wherein the monolayer is a first monolayer, further comprising forming a second monolayer over the second particles; and wherein the second monolayer is comprised by the particle-containing material.

3. The method of claim 1 wherein the first particles have an average maximum dimension of from about 100Å to about 10,000Å; and wherein the second particles also have an average maximum dimension of from about 100Å to about 10,000Å.

4. The method of claim 1 wherein the monolayer is formed from a precursor comprising a halogenated silane.

5. The method of claim 1 wherein the monolayer is formed from dichlorosilane.

6. The method of claim 1 wherein:

the monolayer is formed from dichlorosilane; and

the first and second particles comprise one or more of amorphous carbon, silicon-carbon-oxygen and SiO_2.

7. The method of claim 6 wherein the first and second particles comprise SiO_2.

8. The method of claim 6 wherein the first and second particles comprise silicon-carbon-oxygen.

9. The method of claim 6 wherein the first and second particles comprise amorphous carbon.

10. The method of claim 1 wherein the particle-containing material is electrically insulative.

11. The method of claim 1 wherein the particle-containing material is a low-K dielectric material.

12. The method of claim 1 wherein the particle-containing material is electrically conductive.

13. The method of claim 1 wherein the particle-containing material comprises a catalytic surface containing platinum.

14. The method of claim 1 wherein the particle-containing material comprises photoluminescent or electroluminescent particles.

15. The method of claim 1 at least some of the first and second particles are carbon nanotubes.

16. A method of forming a particle-impregnated material over a semiconductor substrate, comprising:

forming a first monolayer across at least a portion of a surface of the semiconductor substrate;

adhering particles to the first monolayer;

forming a second monolayer over the particles; and

wherein the particles and at least components from the first and second monolayers are comprised by the particle-impregnated material.

17. The method of claim 16 wherein the particles have an average maximum dimension of from about 100Å to about 10,000Å.

18. The method of claim 16 wherein the first monolayer is formed from a precursor comprising a halogenated silane.

19. The method of claim 16 wherein the first monolayer is formed from dichlorosilane.

20. The method of claim 16 wherein:

the first monolayer is formed from dichlorosilane;

the particles comprise one or more of amorphous carbon, silicon-carbon-oxygen and SiO_2; and

the second monolayer is formed from dichlorosilane.

21. The method of claim 20 wherein the particles comprise SiO_2.

22. The method of claim 20 wherein the particles comprise silicon-carbon-oxygen.

23. The method of claim 20 wherein the particles comprise amorphous carbon.

24. The method of claim 20 further comprising exposing the second monolayer to an oxygen-containing reactant to form SiO_2 from at least some of the second monolayer.

25. The method of claim 24 wherein the oxygen-containing reactant is water.

26. The method of claim 16 wherein the particle-impregnated material is electrically insulative.

27. The method of claim 16 wherein the particle-impregnated material is a low-K dielectric material.

28. The method of claim 16 wherein the particle-impregnated material is electrically conductive.

29. The method of claim 16 wherein the particle-impregnated material comprises a catalytic surface containing platinum.

30. The method of claim 16 wherein the particle-impregnated material comprises photoluminescent or electroluminescent particles.

31. The method of claim 16 at least some of the particles are carbon nanotubes.

32. A method of forming a particle-impregnated conductive material over a semiconductor substrate, comprising:

spreading particles over the semiconductor substrate;

forming a monolayer over the particles; and

wherein the conductive layer and particles together are at least part of the particle-impregnated conductive material.

33. The method of claim 32 wherein the particles are electrically conductive.

34. The method of claim 32 wherein the monolayer is electrically conductive.

35. The method of claim 32 wherein the monolayer is electrically conductive, and wherein the particles are electrically conductive.

36. The method of claim 32 wherein the particles comprise carbon nanotubes.

37. The method of claim 32 wherein the particles comprise photoluminescent or electroluminescent materials.

38. The method of claim 32 wherein the particle-impregnated conductive material is catalytic platinum.

39. The method of claim 32 wherein the particles comprise tungsten.

40. The method of claim 39 wherein the monolayer comprises tungsten.

41. The method of claim 40 wherein the particle-impregnated conductive material comprises tungsten silicide.

42. The method of claim 39 wherein the monolayer comprises tantalum.

43. The method of claim 42 wherein the particle-impregnated conductive material comprises tantalum nitride.

44. The method of claim 32 wherein the particles have an average maximum dimension of from about 100Å to about 10,000Å.

45. The method of claim 32 wherein the monolayer comprises tungsten.

46. The method of claim 32 wherein the monolayer comprises tungsten, wherein the particle-impregnated conductive material comprises tungsten silicide, and further comprising exposing the at least some of tungsten of the monolayer to silane to incorporate at least some of the tungsten into the tungsten silicide.

47. The method of claim 46 wherein the monolayer is formed from WF_6.

48. The method of claim 32 wherein the monolayer comprises tantalum.

49. The method of claim 32 wherein the monolayer comprises tantalum, wherein the particle-impregnated conductive material comprises tantalum nitride, and further comprising exposing at least some of the tantalum of the monolayer to NH_3 to incorporate at least some of the tantalum into the tantalum nitride.

50. The method of claim 49 wherein the monolayer is formed from TaF_5.

51. A semiconductor construction, comprising:

a semiconductor substrate; and

a particle-impregnated conductive material over at least a portion of the semiconductor substrate; the particle-impregnated conductive material comprising tungsten-containing particles within a tungsten-containing layer.

52. The construction of claim 51 wherein the tungsten-containing layer comprises tungsten silicide.

53. The construction of claim 51 wherein the tungsten-containing layer consists essentially of tungsten silicide.

54. The construction of claim 51 wherein the tungsten-containing layer consists of tungsten silicide.

55. The construction of claim 51 wherein the particles within the particle-impregnated conductive material have an average maximum dimension of from about 100Å to about 10,000Å.

56. A semiconductor construction, comprising:

a semiconductor substrate; and

a particle-impregnated conductive material over at least a portion of the semiconductor substrate; the particle-impregnated conductive material comprising tungsten-containing particles within a tantalum-containing layer.

57. The construction of claim 56 wherein the tantalum-containing layer comprises tantalum nitride.

58. The construction of claim 56 wherein the tantalum-containing layer consists essentially of tantalum nitride.

59. The construction of claim 56 wherein the tantalum-containing layer consists of tantalum nitride.

60. The construction of claim 56 wherein the particles within the particle-impregnated conductive material have an average maximum dimension of from about 100Å to about 10,000Å.